Presidential party affiliation and electoral cycles in the U.S.economy: evidence from party changes in adjacent terms.

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7 September 2019

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Evidence from Party Changes in Adjacent Terms

Abstract

Unique evidence presented in this study challenges previous findings about presidential politics and business cycles. Prior studies find strong evidence for a Democratic economic growth advantage of about 1.8 percent per year over the course of a term but only weak evidence for a pre- election surge in growth for incumbent Presidents of either party. This study finds a much smaller Democratic advantage and strong evidence for a pre-election growth surge for Republican Presidents relative to Democratic Presidents. The novelty of these results is attributable to the use of repeated party-change reversals in adjacent terms for identification in place of binary changes in isolated terms separated by as much as a half-century in prior studies. We find a strongly partisan Federal Reserve effect on growth as well. Results are insensitive to an extensive battery of robustness checks including a placebo test.

1. Background and Overview

In a study widely circulated in the media during the 2016 presidential election, Blinder and Watson (2016) report significantly higher economic growth under Democratic Presidents. Other studies find a similar differential for Democratic Presidents (about 1.8 percent per year), but Blinder and Watson provide the most exhaustive investigation of factors that might account for this differential. Even so, their study represents only one of several strands of research on the links between presidential politics and business cycles. Drazen (2001) and Sieg (2006) review this expansive literature, so we focus only on studies most relevant here. One strand begun by Fair (1978) examines business-cycle effects on the outcome of presidential elections and finds that faster growth, declining unemployment, and a rising stock market improve reelection odds.

A second strand begun by Nordhaus (1975) and Hibbs (1977) examines whether the election cycle itself induces business cycles aligned with elections. Given that better economic conditions improve the likelihood of reelection, Nordhaus (1975) argues that incumbent administrations stimulate the economy prior to elections and finds supportive evidence. Hibbs (1977) presents a different model based on partisan policy differences. In his model, the economy grows more rapidly after elections if the party with more expansionary policies (hypothesized as the Democratic Party) wins the Presidency. The original Nordhaus and Hibbs models both rely on voter myopia, or the inability of voters to anticipate politically induced election cycles and their potentially harmful inflationary and other consequences. Subsequent adaptations by Alesina (1987), followed by Alesina and Rosenthal (1989) suggest however, that the Hibbs cycle does not require voter myopia because election outcomes are uncertain.

Most evidence strongly favors the Hibbs post-election partisan cycle over the Nordhaus pre-election cycle, at least among OECD countries. Alesina and Rosenthal (1989), for example, find

that the first halves of presidential terms exhibit higher growth under Democratic administrations than under Republican ones consistent with the Hibbs model. In contrast to the strong evidence for the Hibbs cycle, Keech (1995), Drazen (2000), and Canes-Wrone and Park (2012) characterize the accumulated evidence for the Nordhaus cycle as weak. In an effort to explain the frail evidence for the Nordhaus model, Canes-Wrone and Park (2012) propose a 'reverse' pre-election cycle that obscures the Nordhaus cycle. They argue that pre-election uncertainty depresses fixed investments and growth until the election outcome is resolved. Canes-Wrone and Park find evidence for this phenomenon and evidence for a Nordhaus cycle only after removing fixed investments from gross domestic product.

We rely instead on a model proposed by Sieg (2006). This model accounts for incumbent popularity as well as information asymmetry about the incumbent government's efficiency under the assumption that the incumbent government can observe its own efficiency better than the public. Sieg's model incorporates both the Hibbs and Nordhaus cycles without requiring voter myopia for either and explains why the Nordhaus cycle might differ by party. The latter point is crucial because Nordhaus cycle tests typically estimate the original Nordhaus model under the assumption that the pre-election cycle is same for both parties. Schultz (1995) argues that imposing symmetric behavior explains the weak evidence for a pre-election cycle. Our strategy—based on repeated party-shift reversals in adjacent terms—is likely to provide a superior test of this argument because it yields separate estimates of relative differences in party effects in both Nordhaus and Hibbs cycles.

In Sieg's model, the economy expands early in the terms of newly elected left governments consistent with the Hibbs cycle. It also expands later in the term consistent with the Nordhaus cycle if the incumbent administration signals its efficiency by reducing unemployment and

increasing growth before an election. Incentives to do so increase with the competency of the incumbent administration because competence may reduce the potential inflation costs of politically induced surges in growth. These incentives are also stronger for a party in the minority because votes at the margin are more valuable for minority parties. While there is little evidence for a persistent difference in efficiency between Democratic and Republican administrations, there is evidence for persistent differences in popularity. Republican Presidents typically represent a minority party among voters (Haynes and Jacobs 1994). For this reason, the Sieg model suggests Nordhaus cycles may be stronger for Republican Presidents.

We provide novel evidence designed to answer two questions that cut across key strands in the research on links between presidential politics and business cycles. First, do partisan presidential shifts induce cycles aligned with elections consistent with either Hibbs or Nordhaus cycles? Second, to what extent does economic growth differ with the party affiliation of Presidents?

Unlike prior studies, this study identifies estimates using repeated reversals of party shifts in adjacent terms, not binary changes in isolated terms separated by as much as a half century. In our data, these party shifts repeat an equal number of times in each direction as if they were determined randomly. These repeated bi-directional shifts therefore tend to neutralize confounding factors specific to either party or term. Indeed, on average, both growth means and growth trends are identical in adjacent terms with a party change. Moreover, growth means and growth trends are also identical on average for these terms and all other terms.[1]

Our estimates isolate the effects of party changes by disaggregating by the direction of party change and timing within terms. This approach will let us estimate relative party effects in a nested specification that incorporates both the Hibbs and Nordhaus cycles as well as the full term

[1] These other terms are non-adjacent terms and adjacent terms with the same party.

partisan growth gap. This specification also identifies two estimates for the relative party effects, not just one. As demonstrated by James and Stein (1981), all else equal, the average of two estimates is superior to a single estimate.

The use of bidirectional party changes in adjacent terms for identification is crucial. Otherwise, we find standard results, a Democratic growth advantage (gap) of about 1.8 percent per year, a post-election Hibbs cycle, and no pre-election Nordhaus cycle. The results in our models reliant on partisan shifts in the Presidency instead yield a much weaker Democratic gap and both Hibbs and Nordhaus cycles—an early post-election gap for Democrats consistent with a Hibbs cycle and a late pre-election gap for Republicans consistent with a Nordhaus cycle. In addition to these new findings, we assess arguments by Beck (1982) and Chappell, Havrilesky, and McGregor (1993) that Presidents influence Federal Reserve behavior. Our findings provide evidence for a strongly partisan complementarity between the party affiliation of the incumbent President and the party affiliation of the President who appointed the incumbent Fed. chair. The strength of this partisan complementarity result challenges presumptions that the Federal Reserve is politically independent.

2. Testable Hypotheses

Our empirical strategy and models of political business cycles motivate the following four testable hypotheses:

Quasi Randomness

In our data, there are eight changes in party affiliation in adjacent terms, four in each direction from Democratic to Republican (DR) and from Republican to Democratic (RD). These repeated reversals provide the natural experiment we use to identify our estimates. This is so because they

yield quasi-random variation in party changes across adjacent terms and between these terms and other terms. If a god of politics were to flip a coin to determine the outcome of each party transition, the resulting random outcome would yield an equal number of transitions in each direction, which is what we observe. Similarly, the random outcome of whether a party transition occurs or not in the sixteen presidential elections in our data would result in eight party transitions, which is also what we observe.

If the party transitions in adjacent terms were truly random, they would be randomly matched with adjacent terms and unrelated to factors other than the individual party transitions—as in an experiment with randomized assignment to treatment and control groups. In this case, one would expect economic growth to be the same on average in these adjacent terms. In addition, one would expect economic growth to be the same on average between these terms and all other terms. Our first (dual) hypothesis therefore is: *adjacent terms with a party change have the same mean and trend in growth, and on average, these terms have the same mean growth and trend in growth as other terms.* These two conditions identify our estimates. Even if both conditions do hold, a god of politics did not actually match party changes and terms randomly, so we conduct an extensive battery of robustness checks as well.

Hibbs Cycle

Economic growth increases early in each term for Democrats relative to Republicans in the Hibbs model because businesses, workers, and consumers expect Democratic administrations to pursue more expansionary economic policies. This relative increase is concentrated early in the terms of Democratic Presidents as the economy responds soon after the election, but this growth dissipates later in the term as these responses recede. Thus, our second hypothesis is: *in the early term, post-election period, economic growth is higher for Democratic Presidents than for their*

Republican counterparts.

Nordhaus Cycle

In the Sieg (2006) version of the Nordhaus model, information about the efficiency of the incumbent administration is asymmetric. Administrations therefore weigh the costs and benefits of signaling their efficiency to voters by reducing unemployment and increasing growth before elections. Recall that incentives to signal rise with an administration's efficiency, fall with the likely inflation attributable to the stimulus, and rise with a party's minority status because votes at the margin are more valuable for minority parties. This is so because high-efficiency administrations are more likely to signal since the benefits of signaling are greater relative to the potential cost of inflation than they are for low-efficiency administrations. High-efficiency administrations can generate higher growth relative to inflation than low efficiency administrations can. Hence, inflation costs are likely to be too high to entice low-efficiency administrations to attempt to try to pose as a high-efficiency administration. Voters therefore view signals of efficiency as credible. All else the same, the Nordhaus cycle is likely to be stronger for Republican Presidents because this party typically is in the minority among voters (Haynes and Jacobs 1994).

Consequently, our third hypothesis is: *growth tends to rise in the pre-election period late in each term more for Republican Presidents than for Democratic Presidents*. Two points are worth emphasizing. First, efficiency and popularity can vary across the administrations of both parties, so neither all Republican administrations nor all Democratic administrations necessarily choose to signal or not to signal. Second, the insight that minority status (or more broadly, popularity) is a factor in pre-election cycles is useful even if voters fall short of the prescient rationality in Sieg's model and behave instead with the myopia in the original Nordhaus model.[2]

Federal Reserve Cycle

Despite presumptions about the Federal Reserve's institutional independence, the list of presidential attempts to influence the Fed. is both colorful and long. This list includes Truman's attempt in 1951 to force the Fed. to retain a 2.5 percent limit on Treasury yields, Johnson's down-on the-ranch arm twisting of the Fed. chair (William Machesney Martin) in 1965 during the Vietnam War and the Great Society, Nixon's pressure on the Fed. prior to his 1972 reelection, and Trump's public attacks on the Fed. chair. Beck (1982), moreover, finds shifts in Federal Reserve policy that coincide with key political moments. Aside from direct presidential pressure, how might partisanship effects on Fed. policies emerge? Chappell, Havrilesky and McGregor (1993) argue that the most important presidential influence on these policies works indirectly through a President's Federal Reserve appointments. If so, these partisan effects are likely to be greater when party affiliations between the incumbent President and the President who appointed the incumbent Federal Reserve chair are the same.

Both political parties prefer higher growth, lower unemployment and lower inflation, but there are tradeoffs between these objectives, and arguably, the relative weights the two parties place on these tradeoffs differ. If so, then the effects of matching affiliations may differ by party. Compared to Republicans, Democrats appear to place lower weight on low inflation and higher weight on low unemployment. Thus, Blinder and Watson (2016) find Republican administrations tend to inherit higher inflation, higher growth, and lower unemployment from Democratic administrations than Democratic administrations inherit from Republican administrations. Since Democrats likely place greater weight on mitigating income inequality,

[2] Haynes and Stone (1990) and Schultz (1995) note the role of popularity and minority status.

One explanation for this pattern might stem from an argument by Bhandari et al. (2018). These researchers claim that inflation plays a role by helping to offset inequality-increasing shocks to the economy. Although Blinder and Watson (2016) find significant links between growth and partisan Fed. matches, they dismiss them as an explanation for a Democratic growth advantage. Blinder and Watson argue instead that Fed. policies are more favorable to Republicans.

We assess the importance of a Federal Reserve cycle by incorporating it explicitly into our estimates to test our fourth hypothesis that: *partisan complementarities between the party affiliations of the incumbent President and the President who appointed the chair of the Federal Reserve yield higher growth when the affiliation matches are Democratic rather than Republican*.

3. Data and Empirical Specifications

Data

To permit direct comparison to Blinder and Watson (2016) and other related studies, we focus on the same period (1948, quarter 1 to 2013, quarter 2) and use equivalent data. Table 1 presents mean values and standard deviations of the variables used in this analysis.

(Table 1 about here)

The dependent variable is 'growth', the annual percentage growth rate of real GDP per capita, calculated as the first difference of the log of real GDP per capita. As Blinder and Watson note, results are equivalent whether one expresses GDP per capita as per capita or not. Average growth over the entire period is about two percent. The party change variables are 'RD' for shifts from Republican to Democratic administrations and 'DR'for reverse shifts.

Table 1. Variable Means and Standard Deviations (N = 258 quarters).

Variables	Mean	Std. Dev.
Annual percent change in real GDP per capita (growth)	1.969	3.867
RD = 1 if shift from Rep. to Dem. Pres. (1 qtr. lag)	0.248	0.433
First half = 1 if first 4 Qtrs. in a Pres. Term	0.504	0.501
DR = 1 if shift from Dem. to Rep. Pres. (1 qtr. lag)	0.248	0.433
Fed. match gap = 1 if Dem. Pres. & Fed. Chair & -1 if Rep. Match	0.089	0.735
Pproductivity = total factor productivity (1 qtr. lag)	1.274	3.380
Korean War = 1 if Korean War Quarter (1 qtr. lag)	0.050	0.219
Ln Oil price = mean real oil price prior (4 quarter lag)	3.644	0.512

(from 1948, quarter 1 to 2013, quarter 2, as in Blinder Watson, 2016).

As expected, means and standard deviations for RD and DR are identical. Consistent with Blinder and Watson, we lag RD and DR by one quarter and thereby assign the first quarter of the incoming administration's term to the outgoing administration. We explore a longer lag as well and find equivalent results. We follow Alesina and Rosenthal (1989) and divide presidential terms in half to distinguish early- and late-term effects. The binary variable 'first half' equals one in the first eight quarters of each term and zero otherwise; 'second half' is the complementary alternative.

To pursue possible partisan complementarities between Presidents and the corresponding chair of the Federal Reserve, we use the variable 'Fed. match gap'. This explanatory variable equals one when matching party affiliations between Presidents and Fed. chairs are Democratic and minus one when they are Republican. The coefficient on the Fed. match gap therefore yields an estimate of the partisan difference in the effect of matching party affiliations for Democrats versus Republicans. This variable restricts partisan effects to be equal and opposite in sign, a restriction the data do not reject.

The remaining variables in Table 1 are covariate controls used to gauge robustness. We select these variables because Blinder and Watson found them to be most important. As with the party-change variables, we lag these covariates by one quarter, with the exception of the price of crude oil. Consistent with evidence that the full effects of changes in oil prices stretch out as long as a year, 'oil price' is calculated as the logarithm of the average real price of a barrel of crude oil over the previous four quarters.

Empirical Specifications

Recall that repeated party reversals in adjacent presidential terms permit joint estimation of the partisan growth gap along with partisan differences in coefficients for the Hibbs, Nordhaus, and

Federal Reserve cycles. Our results demonstrate that this approach is crucial.

Base equation: Equation 1 below corresponds to the stark base equation estimated by Blinder and Watson (2016). It specifies a single parameter (b) for the full-term Democratic growth gap and no covariate controls.

$$(1)\ \text{growth}_{it} = a + b\text{Dem}_{it} + e_{it}$$

(growth_{it}) is the (annualized) percentage change in real gross domestic product per capita in quarter *t* of presidential term *i*. The parameter (a) is a constant, (Dem) is a binary variable equal to one for Democratic Presidents, and (b) is the corresponding coefficient for the Democratic growth gap relative to Republicans. The final term (e) is an error term. To be consistent with Blinder and Watson, we assign the first quarter of growth in each new administration to the outgoing administration. Identification in equation 1 relies on variation between terms of Democratic and Republican Presidents across both adjacent and non-adjacent terms. In all estimates, we adjust standard errors for first-order autocorrelation, heteroscedasticity, and choose a conservative approach by clustering these errors by term.

Extended-base equation: Equation 2 below extends base equation 1 to nest three effects—separate Hibbs and Nordhaus cycles and the full-term difference in growth between Democratic and Republican Presidents. As in equation 1, identification relies on variation between terms of Democratic and Republican Presidents across both adjacent and non-adjacent terms.

$$(2)\ \text{growth}_{it} = \beta_0 + \beta_1 \text{first half}_{it} + \beta_2 \text{Dem}_{it} + \beta_3 \text{first half}_{it} * \text{Dem}_{it} + \varepsilon_{it}$$

(β_0) is a constant; (first half) indicates the first two years of each term. We follow Alesina and Rosenthal and identify the early post-election period with the first half of each term and the later pre-election period with the second half. (Dem) indicates a Democratic term. (β_0) is an intercept.

The (β) are corresponding coefficients and (μ) is an error term. (β_3) represents the first-half (Hibbs-cycle) gap measured as Democratic relative to Republican terms. Similarly, (β_2) represents the second-half (Nordhaus-cycle) gap. The full-term gap is the average of the two half-term gaps.

Adjacent-term equation. Equation 3 below nests the same three effects as in equation (2), and illustrates a key advantage of our identification strategy. The repeated reversals in party changes identify multiple estimates for each partisan gap instead of just one, as in equations (1) and (2). All else the same, the average of these estimates is superior to a single estimate.[3]

(3) $\text{growth}_{it} = \gamma_0 + \gamma_1 \text{first half}_{it} + \gamma_2 \text{RD}_{it} + \gamma_3 \text{first half}_{it} * \text{RD}_{it} + \gamma_4 \text{DR}_{it} + \gamma_5 \text{first half}_{it} * \text{DR}_{it} + \mu_{it}$

Recall that RD and DR are party changes from Republican to Democratic and Democratic to Republican, respectively. The parameter (γ_0) is an intercept. The (γ) are corresponding coefficients, and (μ) is an error term. The first-half (Hibbs-cycle) gap in equation 3 is the average of (γ_3-γ_5), measured as Democratic relative to Republican terms. Similarly, the second-half (Nordhaus-cycle) gap is the average of (γ_2-γ_4). The full-term gap is the average of the two half term gaps.

4. Results

In light of its centrality to our identification strategy, we begin by testing our first (dual) hypothesis that (1) adjacent terms with a party change have the same mean growth and trend in growth, and (2) these adjacent terms have the same mean growth and trend in growth as other terms

The two identifying conditions embodied in this dual hypothesis hold in our data. Mean growth

[3] See James and Stein (1981). We use a simple average because the standard errors are similar.

and trend growth are the same on average in adjacent terms with a party change. The mean difference in growth in adjacent terms is only (0.09) and not significantly different from zero ($p = 0.94$). The difference in trend growth is also only (0.09) and not significantly different from zero ($p = 0.13$). In addition, mean growth and trend in growth are both also the same on average in adjacent terms and all other terms. The mean difference in growth in this case is (0.17) and not significantly different from zero ($p = 0.80$). Failure to reject either of the identifying conditions suggests that the repeated reversals in party changes in adjacent terms identify quasi-random variations that tend to neutralize extraneous confounding factors. Of course, quasi-random is not strictly random, so we also gauge the robustness of the estimates against the role of other potential factors with an extensive battery of robustness checks.

Base Equations

Table 2 presents regression estimates of the base and extended base equations 1 and 2. The first column of estimates in Table 2 parallels a similar equation in Blinder and Watson (2016) and yields similar results. The growth gap for Democrats is 1.83 and is significantly positive. The R square is low as is usual when a dependent variable is first-differenced. The second column in Table 2 presents estimates of the base equation extended to incorporate coefficients for the Hibbs and Nordhaus cycles. 'First half' identifies the first two years of a term. The coefficient is insignificant, but the 'First half' interaction with Dem is large and significantly positive. This result indicates a significant post-election Hibbs cycle in which relative to Republican Presidents, Democratic Presidents tend to experience expanding economies early in their terms.

(Table 2 about here)

There is no significant evidence for a Nordhaus cycle in Table 2 however. The main effect for

Table 2. Estimates of Base Equations 1 and 2 of Percent Change in Real GDP per Capita.

Explanatory Variables	Model 1	Model 2
Constant	1.166*	2.169*
	(0.318)	(0.714)
First-Half	-------	-1.856
	-------	(1.102)
First-Half x Dem. Pres.	-------	3.163*
	-------	(1.268)
Dem. Pres.	1.826*	0.055
	(0.459)	(0.936)
First-half Gap	-------	3.163*
	-------	(1.268)
Full-term Gap	1.826*	1.609*
	(0.459)	(0.319)
N (quarters)	258	258
R Squared	0.029	0.065
BIC	1394	1396

(Data from 1948, quarter 1 to 2013, quarter 2, as in Blinder Watson; Std. errors adjusted for heteroscedasticity, first-order autocorrelation, and clustered by term)

Democrats is insignificant indicating no late-term party difference. While the negative main effect for first half is suggestive of a second-half expansion, it is insignificant as well. The full term gap in column 2 is the average of the first- and second-half coefficients for Democrats (3.16 and 0.05, respectively). It declines slightly from (1.83) in column 1 to (1.61) in column 2 but remains significant.

Adjacent-Term Equations

Table 3 presents estimates for adjacent term equations based on equation 3. Two estimates of partisan differences in economic growth instead of just one yield a superior estimate but require calculating the relevant average of the two separate estimates along with its corresponding standard error. In Table 3 we present the average partisan gaps in growth for Democratic versus Republican administrations along with the estimates used to calculate the corresponding average. In each case, we use the coefficient for the transition from a Republican to a Democratic President minus the coefficient for the reverse transition to calculate this average.

(Table 3 about here)

Column 1 of Table 3 presents estimates of equation 3 with no additional covariates included. The coefficients associated with RD and DR are both significant and roughly equal but opposite in sign (-3.47 and 2.48 respectively), which helps to explain why evidence for a Hibbs cycle is strong even when based on a single binary variable for party, as in column 2 of Table 2. The first-half gap in growth for Democrats based on the two interacted party coefficients is (2.92) and significant. The coefficients for RD and DR are estimates of second-half party differences. Note that neither is significant, yielding no evidence for a differential Nordhaus cycle.

Table 3. Estimates of Adjacent-Term Equation 3 of Percent Change in Real GDP per Capita.

Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	1.804*	2.034*	1.619*	1.749*	4.379*	4.145*
	(0.684)	(0.542)	(0.574)	(0.633)	(1.647)	(0.622)
first half	-0.142	-0.223	-0.123	-0.194	-0.180	-0.154
	(0.578)	(0.585)	(0.572)	(0.611)	(0.582)	(0.655)
RD x first half	2.381*	2.537*	2.333*	2.424*	2.258*	2.212
	(1.057)	(1.073)	(1.079)	(1.091)	(0.989)	(0.959)
DR. x first half	-3.466*	-3.515*	-3.570*	-3.437*	-3.486*	-3.548
	(1.556)	(1.5760	(1.581)	(1.566)	(1.530)	(1.797)
RD.	-0.346	-1.088	-0.679	-0.859	-0.470	-0.635
	(1.038)	(0.844)	(0.857)	(0.877)	(0.708)	(0.712)
DR	1.855	2.156*	2.139*	2.074*	2.071*	2.047*
	(0.934)	(0.927)	(0.918)	(0.974)	(0.986	(0.960)
first-half gap	2.924*	3.026*	2.952*	2.931*	2.919*	2.879*
	(0.865)	(0.879)	(0.825)	(0.837)	(0.832)	(0.867)
second-half gap	-1.101*	-1.622*	-1.409*	-1.417*	-1.442*	-1.341*
	(0.499)	(0.506)	(0.477)	(0.424)	(0.8420	(0.867)
full-term gap	0.912*	0.702*	0.772*	0.732*	0.738*	0.769*
	(0.280)	(0.307)	(0.412)	(0.287)	(0.285)	(0.317)
Fed match gap	-------	1.066*	0.883*	0.994*	0.798*	0.923*
		(0.367)	(0.392)	(0.378)	(0.367)	(0.334)
Productivity	-------	-------	0.225*	0.226*	0.222*	0.223*
			(0.042)	(0.042)	(0.041)	(0.223
Korean War	-------	-------	-------	-1.038	-1.049	-1.350
				(1.537)	(1.542)	(1.728)
oil price	-------	-------	-------	-------	-0.745	-0.669
					(0.367)	(0.355)
number of quarters	258	258	258	258	258	258
Rsq	.063	.084	.128	.130	.134	.126
BIC	1407	1407	1399	1405	1409	1411

(Data from 1948, quarter 1 to 2013, quarter 2, as in Blinder Watson; Std. errors adjusted for heteroscdasticity, first-order autocorrelation, and clustered by term).

Nevertheless, the second-half gap calculated using estimates for both RD and DR (-0.35 and 1.86, respectively) is (-1.10) and significant (the second-half gap for Democrats is calculated as the average of the coefficient for RD minus the coefficient for DR).

Recall that the single binary variable for Dem in column 2 of Table 2 does not yield this significant second-half party differential. Yet our two bi-directional party variables (DR and RD) do yield this result. The significantly negative second-half party gap in column 1 of Table 3 indicates a significantly larger Nordhaus cycle for Republicans than for Democrats, a result consistent with the Sieg model and the Republican party's minority status. The full-term Democratic gap based on the estimates of the first- and second-half gaps in column 1 of Table 3 (2.92 and -1.01, respectively) declines to (0.91) or roughly half the gap of 1.83 in column 1 of Table 2, but it remains significant.

To recap, our estimates support the following: *no significant difference in either mean growth or trend growth in adjacent terms with a party change or between these terms and all other terms* (hypothesis 1), *a significant Hibbs cycle growth advantage for Democrats* (hypothesis 2)*, and a significant Nordhaus cycle growth advantage for Republicans* (hypothesis 3). The estimates also indicate a full-term growth advantage for Democrats that is roughly half the usual estimate of 1.8 found by Blinder and Watson (2016) and others. Before pursuing our battery of robustness checks, we turn to the issue of a partisan Federal Reserve cycle (hypothesis 4).

Federal Reserve Cycle

Column 2 of Table 3 includes a coefficient for 'Fed. match gap', a variable capturing the partisan difference for matches between the party affiliation of the incumbent President and the party affiliation of the President who appointed the incumbent chair of the Federal Reserve. Recall that

'Fed. match gap' equals one for matching Democratic affiliations and minus one for matching Republican affiliations. This formulation imposes the restriction that the effects of matching party affiliations are equal but opposite in sign. The estimates, however, do not reject this restriction. The coefficient for Fed. match gap in Table 3 is (1.07) and significant. Estimates for other variables remain similar to those in column 1, although the second-half gap for the Nordhaus cycle increases in absolute value, and the full-term gap declines further to (0.70). These estimates suggest that strong partisan differences in the behavior of the Federal Reserve are present and support hypothesis 4.

5. Robustness.

We turn next to gauging the robustness of the estimates in Table 3. To do this, we consider those factors found to be important by Blinder and Watson (2016). These include total factor productivity, the Korean War, and oil prices. We enter these explanatory variables one at a time in a cumulative sequence. We are most interested in the extent to which the inclusion of these controls alters our partisan coefficient estimates and less interested in their explanatory power.

As expected, productivity enters with a significantly positive sign in column 3 of Table 3 while the other key results remain equivalent to their values in columns 1 and 2. A binary variable for the Korean War enters with an insignificant coefficient in column 4 of Table 3 with other estimates again remaining essentially the same. Blinder and Watson find a significant Korean War effect only during the Truman administration and little evidence for the effects of other armed conflicts during the total period in question. Oil price changes typically take up to a year to exert their full influence. Consequently, we add ‘oil price’ measured as the log of an index for average real crude oil prices over the previous year to the estimates presented in column 5 in Table 3. Oil price enters with the expected negative sign but is insignificant. Once more the

estimates of other variables remain about the same as they are in columns 1 and 2. Given widespread evidence confirming the economic importance of oil-price shocks, the persistence of these partisan coefficient estimates provide added support for our novel identification strategy.

In column 6, the final column in Table 3, we pursue the possible importance of longer lagged party change effects by using four-quarter moving averages for the party-change variables. Note that a year long moving average again results in overlapping presidential responsibilities for the economy. Kane (2017) presents evidence that, after accounting for longer lags and overlapping presidential responsibilities, the Democratic growth advantage disappears. The estimates in column 6 not only address the issues raised by Kane but also serve as a robustness check for our key results. Despite this year-long party effect, moving-average smoothing, and the longer overlap in presidential economic responsibilities, the partisan coefficient estimates in column 6 remain roughly the same. This is so even when compared to the estimates in the stark specification in column 1 of Table 3, which excludes additional covariate controls. Note that the Democratic growth advantage declines slightly, but remains significant. When we assess the parsimonious explanatory power of these models with the Bayesian Information Criterion (BIC), the results show the specification in column 3 of Table 3, which includes the Fed. match and productivity variables, does best on this criterion.

We next summarize three additional robustness checks based on models not shown. We focus first on Nixon's 1972 election and follow with a placebo test based on Presidents ineligible for reelection. Tufte (1978) and others point to Nixon's 1972 re-election campaign and his economic policies in this year as a key example of a pre-election stimulus. To determine if the significant Nordhaus-cycle effects found here are an artifact of that 1972 episode, we enter a binary variable coded one for 1972, but the Nordhaus cycle results remain equivalent. To account for the

possible influence of other confounding factors, we also enter a time trend and its square and the partisan results persist.

The final robustness check is a placebo test. These tests are helpful because they assess whether the estimated effects of a natural experiment are spurious results attributable to extraneous confounding factors. Two-term Presidents are ineligible for a third term. Nordhaus-cycle effects therefore should not be significant for two-term Presidents in their last term unless broader party objectives dominate. To evaluate this placebo effect, we enter a binary variable coded one for the final terms of two-term Presidents and find these final term Nordhaus cycle effects to be insignificant.

6. Implications

The evidence from our natural experiment based on repeated reversals of presidential party changes in adjacent terms adds to the growing number of examples in the social sciences demonstrating the strengths, weaknesses, and potential of natural experiments (see Gerber and Green 2011 and Leatherdale 2019 for reviews of this method). Briefly, the strength and robustness of estimates based on natural experiments depend on the number of repetitions and reversals in the natural experiment and on their resilience to robustness checks including placebo tests akin to the one performed here.

The significance of business cycles aligned with elections and political affiliations of Presidents, especially the pre-election Nordhaus cycles, beg the question of whether these cycles generate harmful inflation or other distortions that require institutional reforms. Hairault and Langot (2012) and others suggest the social welfare costs of business cycles can be large. Rogoff (1990) examines possible institutional reforms in the context of the signaling model that both he and Sieg (2006) rely on. This signaling model yields equilibrium cycles that lower social welfare

when compared to the case with full information about incumbent efficiency. Yet restrictions on incumbent behavior that limit discretion would be even more harmful if incumbents were to use more costly methods to signal their efficiency. One reform suggested by Tufte (1978) and evaluated by Rogoff is a constitutional amendment that restricts fiscal discretion in election years. Even if such an amendment was politically feasible, limits on election-year discretion come with their own costs in terms of unforeseen contingencies. These reforms may be ineffective or even counterproductive unless they eliminate *all* forms of fiscal discretion. Because Presidents have so many fiscal levers readily at hand, such completely exhaustive restrictions seem unlikely.

The voter myopia in the original Nordhaus model might make restrictions on incumbent behavior more promising than in the Rogoff-Sieg signaling model. For this reason, it would be useful for future research to assess the empirical validity of the signaling model versus the original Nordhaus model. One direct way to distinguish between these pre-election Nordhaus cycle models would be based on measures of incumbent efficiency employed to assess the extent to which Nordhaus cycles vary with competency. Post-election Hibbs cycles appear to be an intrinsic consequence of left-right policy differences, perhaps accentuated by election outcome uncertainty. The strongly partisan Federal Reserve cycle findings in this research yield two additional implications: first, the Federal Reserve may play a role in the partisan contrasts evident in our results; and second the Federal Reserve appears to lack the political independence originally intended and often presumed.

7. Concluding Remarks

A difficulty in the political business cycle literature has been the inability to explain why evidence for pre-election cycles is weaker for the European democracies. One possibility is that

the timing of elections can be less predictable in parliamentary systems. This uncertainty partly is attributable to elections called after successful no-confidence votes. Because these elections are largely unanticipated, they do not provide sufficient time to stimulate the economy before an election. Even so, such elections have become less common in European countries. Another possibility is the degree of integration among European economies. This greater integration makes it more difficult to detect the independent effects of national economic policies in Europe.

Despite this and other difficulties, the role of presidential politics in business cycles in the U.S. has captured the attention of some of the most prominent scholars in both political science and economics for the better part of the last half century. Our novel estimates yield answers to two central questions that cut across multiple strands in this literature, and they provide evidence on the degree to which Federal Reserve policies reflect partisan interests.

Consider first two central questions in the literature about the relationships between presidential politics and business cycles. Our findings suggest that party shifts induce cycles aligned with elections consistent with both the Hibbs and Nordhaus cycles. We find evidence for a significant pre-election surge in growth for Republican relative to Democratic Presidents that is consistent with Nordhaus cycles. And we find evidence for a significant post-election surge for Democratic relative to Republican Presidents that is consistent with Hibbs cycles. The Republican pre-election surge may stem from their minority status. The post-election surge for Democrats may stem from differing partisan objectives. Our results suggest as well that the difference in economic growth attributable to differences in the party affiliation of Presidents is roughly half the magnitude typically found by prior studies. The novelty of these results is attributable to our use of party-change reversals in adjacent terms in place of the single binary changes in isolated terms separated by as much as a half century that were used in prior studies.

Finally, consider the question of whether the Federal Reserve's role in the economy reflects partisan interests. The results in this investigation are consistent with our Federal Reserve cycle hypothesis. They show that matching Democratic affiliations between the incumbent President and the President who appointed the incumbent Federal Reserve chair yield higher growth than the equivalent match of Republican affiliations. In addition to our unique results about the links between presidential partisanship and the amount and political timing of economic growth, this study yields another important political finding: Our estimates suggest the Federal Reserve is not immune from partisan influences.

The magnitude and robustness of these partisan influences on the U.S. economy isolated in this study and in the prior literature along with their large social welfare costs call for a better understanding of their political origins and consequences. We hope this investigation will stimulate further efforts to understand both.

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